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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/632,891	08/07/2000	Curtis L. Munson	UMMG-1544-C	2969

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EXAMINER

NGUYEN, TAM M

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 02/19/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/632,891

Applicant(s)

MUNSON ET AL.

Examin r

Tam M. Nguyen

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 and 27-65 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 27-65 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 1764

DETAILED ACTION

Response to Amendment

The rejection of claims 1-14, 27-30, and 32-65 under 35 USC § 103 is withdrawn by the examiner in view of the Appeal Brief filed on December 2, 2002.

A new non-final rejection follows.

Information Disclosure Statement

The reference identified as "New Sorbents for Olefin/paraffin separations by adsorption via π -Complexation", R-. T. Yang E.S. Kikkinide, AIChE Journal, March 1995 vol. 41, No. 3, pp. 509-517" in the IDS of October 6, 2000 appears to be incorrectly identified because the authors of the reference are Joel Padin and Ralph T. Yang. The page numbers listed for the reference are also incorrect. The page numbers should be from 1-22, not from 509-517.

Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 11-25, 27, 28 and 30-63 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No.

Art Unit: 1764

6,215,037. Although the conflicting claims are not identical, they are not patentably distinct from each other because both the presently claimed process and the patented claimed process are drawn to a similar process which utilizes the same adsorbent. The claimed process of the U.S. Patent does not claim that the alkene feedstock comprises a sulfur compound such as hydrogen sulfide. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the patented claimed process by utilizing the presently claimed feed because it would be expected that the results would be the same or similar when using a feed that comprises a small amount of hydrogen sulfide because a small amount of hydrogen sulfide would not affect the outcome of the claimed process of the U.S. Patent.

Claims 1-14, 29 and 30 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 6,423,881. Although the conflicting claims are not identical, they are not patentably distinct from each other because both the presently claimed process and the patented claimed process are drawn to a similar process which utilizes the same adsorbent. The patented claimed process does not claim that the alkene feedstock comprises sulfur compound such as hydrogen sulfide. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the patented claimed process by utilizing the presently claimed feed because it would be expected that the results would be the same or similar when using a feed that comprises a small amount of hydrogen sulfide because a small amount of hydrogen sulfide would not affect the outcome of the claimed process of the U.S. Patent.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

Art Unit: 1764

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 65 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation “the gaseous mixture is contained in a conventional cracked gas stream before any desulfurizing distillation step” was not described in the specification at the time the application was filed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-14, 30 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by “New Sorbents for Olefin/paraffin separations by adsorption via π -Complexation”, Joel Padin and Ralph T. Yang, pp.1-22.

Padin discloses a composition comprising a carrier such as silica and a silver compound such as AgNO_3 wherein the carrier has a BET surface area of about $384 \text{ m}^2/\text{g}$ and a pore size of about 8.4 Angstroms. (See abstract)

It is reminded that claims 11-14, 30 and 33 are drawn to a product. Therefore, the intended use of the product is not patentably significant.

Art Unit: 1764

Claims 55-64 are rejected under 35 U.S.C. 102(b) as being anticipated by “Materials and Interfaces Ab Initio Molecular Orbital study of Adsorption of Oxygen, Nitrogen, and Ethylene on Silver-zeolite and silver Halides”, N. Chen and R.T. Yang, Ind. Eng. Chem. Res. 1996, vol. 35, pp. 4020-4027”

Yang discloses a composition comprising zeolite X or Y with Ag^+ or Cu^+ (See entire reference).

It is reminded that claims 55-64 are drawn to a product. Therefore, the intended use of the product is not patentably significant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

Art Unit: 1764

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7, 10, 29, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over "New Sorbents for Olefin/paraffin separations by adsorption via π -Complexation", Joel Padin and Ralph T. Yang, pp.1-22 in view of Ogawa et al. (6,042,797).

Padin discloses a process for separating olefins (e.g., propylene) from an olefin/paraffin mixture by using an adsorbent having a monolayer of a silver compound (e.g., AgNO_3 , AgI , or AgCl) dispersed on substantially the surface area of a carrier (e.g., SiO_2). The carrier has a BET surface area of about $384 \text{ m}^2/\text{g}$ and a pore size of about 8.4 Angstroms. The adsorption step is operated at a temperature of about 25°C and at a pressure of about 1 atm and wherein the retaining of alkene is accomplished by formation of π -complexation bonds between the silver compound and the alkene. (See pages 1-14)

Regarding claim 1, Padin does not disclose that the gaseous alkene comprises a sulfur compound. However, Ogawa discloses a process for removing ethylene from a gaseous mixture containing ethylene and a sulfur compound (e.g., sulfur oxide) by contacting the gaseous mixture with an adsorbent. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Padin by using an olefinic feed comprising a sulfur compound because, as taught by Ogawa, sulfur compounds would not affect the outcome of the process.

Art Unit: 1764

Regarding claims 1 and 29, Padin does not disclose the step of changing at least one of the pressure and temperature to release the alkene-rich component from the adsorbent. However, Ogawa teaches that the adsorption step is operated at a higher temperature than the desorbing temperature (see col. 3, lines 2-5; col. 7, lines 14-18). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Padin by changing temperature as taught by Ogawa because such temperature change is effective to desorb alkene from the adsorbent.

Regarding claim 29, both Padin and Ogawa do not disclose that the sulfur compound is hydrogen sulfide and its amount in the feed is up to about 66 mole %. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Padin by using an alkene feedstock comprising a small amount of hydrogen sulfide (e.g., 0.001 ppm) because it would be expected that a small amount of hydrogen sulfide present in the feedstock would not affect the outcome of the Padin process.

Regarding claim 65, Padin does not disclose that the alkene feedstock is a conventional cracked gas stream before any desulfurizing distillation steps. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Padin by using the claimed feedstock because of the similarity between the claimed feedstock and the modified Padin feedstock, it would be expected that the results would be similar when using the claimed feed.

Claims 8 and 9 and are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, and further in view of Ramachandran et al. (5,744,687).

Art Unit: 1764

Regarding claims 8 and 9, Padin does not disclose the step of changing at least one of the pressure and temperature to release the alkene-rich component from the adsorbent. However, Ramachandran discloses a method of separating gaseous alkene (e.g., ethylene) from a gaseous alkane by an adsorption process. The desorption step is operated at a temperature from about 100 to 350⁰ C and at a pressure from about 20 to 5000 millibars. (see col. 1, lines 48 through col. 5, lines 52). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Padin by changing pressure as taught by Ramachandran because such pressures and temperatures are effective to desorb alkene from the adsorbent.

Claims 1-7, 10, 29, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa et al. (6,042,797) in view of "New Sorbents for Olefin/paraffin separations by adsorption via π -Complexation", Joel Padin and Ralph T. Yang, AIChE Journal, March 1995, pp.1-22.

Ogawa discloses a process for removing ethylene from a gas mixture containing ethylene and a sulfur compound (e.g., sulfur oxide) by contacting the gas mixture with an adsorbent which comprises a silver compound (silver nitrate) and zeolite. The desorbing step is operated at a temperature from 200 to 300⁰ C and the adsorption step is operated at a higher temperature than the desorbing temperature. The pore size of the adsorbent ranges from 3.4 to 5.5 Å. See col. 2, line 59 through col. 8, line 7)

Regarding claims 1-7 and 29, Ogawa does not disclose that silver compound is dispersed on the adsorbent and the physical and chemical characteristics of the adsorbent. However, Padin discloses an adsorption process of alkene by utilizing the claimed adsorbent as discussed above.

Art Unit: 1764

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Ogawa process by using the Padin adsorbent because the Padin adsorbent is effective to remove alkene from a gaseous mixture.

Regarding claim 29, Ogawa do not disclose that the sulfur compound is hydrogen sulfide and its amount in the feed is up to about 66 mole %. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ogawa by using an alkene feedstock comprising a small amount of hydrogen sulfide (e.g., 0.001 ppm) because it would be expected that a small amount of hydrogen sulfide present in the feedstock would not affect the outcome of the Ogawa process.

Regarding claim 65, Ogawa does not disclose that the alkene feedstock is a conventional cracked gas stream before any desulfurizing distillation steps. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ogawa by using the claimed feedstock because of the similarity between the claimed feedstock and the modified Ogawa feedstock, it would be expected that the results would be similar when using the claimed feed.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-7 above, and further in view of Ramachandran et al. (5,744,687)

Ogawa does not disclose the operating temperatures and pressures. However, Ramachandran discloses a method of separating gaseous alkene (e.g., ethylene) from a gaseous alkane by an adsorption process wherein the adsorption step is operated at a temperature ranging from 50 to 250⁰ C and at a pressure from about 0.2 to about 100 bar (0.197 - 99 atm) and the

Art Unit: 1764

desorption step is operated at a temperature from about 100 to 350⁰ C and at a pressure from about 20 to 5000 millibars (see col. 1, lines 48 through col. 5, lines 52). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Ogawa process by utilizing the adsorption and desorption operating conditions of Ramachandran because the Ramachandran conditions are effective to adsorb and desorb ethylene/propylene.

Claims 27, 28, and 32 are rejected under 35 U.S.C. 103(b) as being unpatentable over Milton (2,882,243).

Milton discloses a process of adsorbing butadiene from a hydrocarbon feed mixture containing butene by using an A-zeolite adsorbent which comprises alkali and alkaline earth metal cations. The adsorbing occurs at a temperature around 25 to 100 ⁰C and at about 200 mmHg pressure. The adsorbent is activated by heating it at a reduced pressure to remove adsorbed materials. (See col. 4, lines 20-25; col. 6, line 50; col. 12, lines 7-11; col. 15, lines 1-11; col. 20, lines 10-39)

Regarding claim 28 and 32 Milton does not disclose the pressures and temperatures in the desorption step. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Milton process by desorbing butadiene from the adsorbent at a temperature from about 70 to 120 ⁰C at a pressure from 0.1 to 5 atm because Milton's adsorption temperature for butadiene is about 25 ⁰C and Milton also discloses that the conditions used for desorption of an adsorbate from zeolite A vary with the adsorbate and include raising the temperature and/or reducing the pressure. Therefore, it would be

Art Unit: 1764

effective to operate the desorption step by utilizing a temperature higher than 25⁰ C (e.g., 70⁰ C) and at a lower pressure (e.g., 1 atm) in the process of Milton.

Regarding claim 32, Milton does not disclose that sulfur compounds (e.g., hydrogen sulfide) and its amount are contained in the feedstock. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Milton process by utilizing a feedstock containing a tiny amount of hydrogen sulfide (e.g., 0.01 ppm) because it would be expected that the tiny amount of hydrogen sulfide present in the feedstock of Milton would not affective the outcome of the process of Milton.

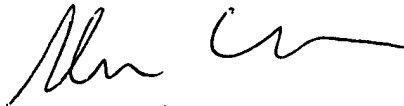
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (703) 305-7715. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Tam Nguyen/ TN
February 7, 2003


Glenn Caldarola
Supervisory Patent Examiner
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